Juvenile Monitoring Satellite Project Work Team

Meeting Notes
August 16th, 2006
Yolo Bypass Wildlife Area

Participants: Bill Poytress (chair-FWS), Jim Earley (FWS), Erin Chappell (DWR), Clint Garmin (DFG), Tracy McReynolds (DFG), Alicia Seesholtz (DWR), Tom Cannon (Wildlands Inc), Felipe Carrillo (FWS), David Colby (FWS), Jason Kindopp (DWR), Kellie Whitton (FWS), Aric Lester (DWR), Dennis Blakeman (DFG), Michelle Workman (EBMUD), Richard Corwin (USBR), JD Wikert (FWS), Diane Coulon (DFG), Andrew Hamilton (FWS), Pat Brandes (FWS), Jess Newton (FWS), and Matt Brown (FWS).

I. **Introductions and Announcements:** Welcome newest participants Alicia Seesholtz (DWR-Feather River) and Clint Garmin (DFG-Chico). Hiring opportunities announced for the Red Bluff Fish and Wildlife Office (temporary Fish Biologist positions currently being advertised) and the California Department of Fish and Game is currently accepting applications for Senior and Staff Environmental Scientist exams. Applications are due Sept 8, 2006.   http://www.dfg.ca.gov/hrb/pages/currentdfgexams.html

II. **Modify/Adopt agenda** – No Comments.

III. **Modify/Adopt draft meeting notes from 4/19/06** - The previous meeting notes were adopted with no further comments.

IV. **Mini-Group Discussion of JMPWT Mission Statement.**

B. Poytress read and discussed the Draft Mission statement to be posted on the IEP website. The only comment expressed was to mention the idea of collaboration in an effort to reduce duplication of effort. A sentence was changed to reflect that comment and the following statement will be sent to Alice Low for uploading to the website:

"The Juvenile Monitoring Project Work Team (JMPWT) is a satellite team of the Central Valley Salmonid Project Work Team. The goal of the JMPWT is to bring together biologists to collaborate in a manner that will benefit juvenile monitoring activities in the Central Valley. The specific objectives of the group include, but are not limited to:
(1) increase the quality and utility of juvenile monitoring data,
(2) standardize sampling techniques (where applicable),
(3) improve methods for analyzing and presenting monitoring data,
(4) identify research questions and data gaps,
(5) provide expert recommendation and/or review of issues affecting juvenile salmonids, and
(6) collaborate on data compilation projects in an effort to expand the knowledge of fisheries biology within the Central Valley of California."

Thanks to all who expressed interest and comments.

V. **Mini Group Discussion Topic: Updating the Central Valley Salmon and Steelhead Existing Monitoring Programs' Summary.**

B. Poytress asked the group to read over the summary as it pertains to the program manager's projects and provide Alice Low with updated information, if applicable, as soon as possible. Alice can be reached at alow@dfg.ca.gov The summary is available at: http://www.dfg.ca.gov/nafwb/pubs/2005/CV_MonitoringPrograms.pdf

VI. **Group Discussion Topic Aric Lester (DWR) –** *North of Delta Off Stream Storage Fisheries Net Benefit –Discussion of Important Questions and Approaches to Monitoring to get Resolution.*

A. Lester began the discussion by briefly stating the objectives of the proposed off stream storage project (Sites Reservoir, TC, GCID, and new pumping station near Maxwell) and noted that overall the project will need to result in a net environmental benefit to be in accordance with CALFED goals. He noted that the project will need baseline data to be able to consider the impact or net benefit of the project. The project will need to be compliant with existing programs such as CALFED, AFRP, and State and Federal Recovery Plans. **A.Lester** asked the group to provide input to put together a considerable fisheries monitoring program for the Sacramento River with a major focus on the proposed pumping plant location at RM 158 [near Maxwell, CA]. **JD Wikert** asked what benefits, besides water storage and reliability could be obtained from such a project. To which **A. Lester** replied the project may result in more flexible uses of Lake Shasta water, reduced pumping during the summer and spring, removal of Red Bluff Diversion Dam, and potential benefits to sturgeon. The project may result in releases of water from the proposed Sites reservoir instead of other Central Valley reservoirs during certain times of the year to provide flow and cold water storage benefits. **D. Blakeman** noted that moving water in the Tuolomne River system has not worked too well. **P. Brandes** asked if the proposed project could be considered beneficial if it results in offsets to other projects that have negative impacts on the fishery. **A. Lester** noted he would need to find out about that concept. He stated overall he needs sampling method ideas and considerations for the affected area. He noted this project may take a Battle Creek Restoration Project approach with respect to the way the Greater Battle Creek Working Group functioned and how the monitoring and adaptive management plans were developed. **M. Workman** stated that the **JMPWT** is likely best suited to review a proposed sample design/project as opposed to producing a monitoring plan. **B. Poytress** concurred that this is probably the way to proceed. **A. Lester** noted this and will likely produce something for the group to discuss in more detail at another meeting.

VII. **Featured Group Discussion Topic:** *Juvenile Abundance Estimates and Confidence Interval Procedures.*

The discussion began with **Kellie Whitton (FWS)** speaking about her recent task of creating abundance estimates and confidence intervals for Battle Creek rotary-screw trap data. **K. Whitton** disseminated (as well as emailed to the group in advance) a list of published papers and grey literature related information.   Additionally she disseminated a

summary titled, "Literature Search to Determine how Efficiency Trials are Used to Estimate Fish Passage or Production" describing a number of concerns when performing mark-recapture experiments to estimate fish passage. [Excellent work Kellie for putting together a substantial list of information and references concerning this important topic]. She also put together a few slides in Powerpoint to discuss some common Mark-Recapture Estimators in an effort to create discussion concerning what the JMPWT members projects are using. She discussed the Lincoln-Peterson, the Bailey's Modification, and Chapman's Modification estimators. For the Lincoln-Peterson estimator she noted 1) it tends to over estimate the true population size particularly at small sample sizes, 2) it is derived by the Maximum-Likelihood theory which is optimal for large sample sizes and 3) it does not have a finite expectation (If r = 0 then N is undefined). For the Bailey's Modification: 1) the estimator has a finite expectation when R = 0, 2) when a stratified design is used, it is considered least biased (Steinhorst et al 2004; used for the one-site experiment in Carlson et al. 1998) and 3) sufficient fish should be marked so that seven or more recaptures occur. For the Chapman's Modification she noted 1) it deals with small sample bias, 2) it requires recaptures to >7, 3) this estimator has a finite expectation at large sample sizes, and 4) is basically equivalent to the Lincoln-Peterson at large sample sizes. There are others, but **K. Whitton** looked predominantly to Carlson and Steinhorst's method for her estimator.

Comment [b1]: Kellie, please make sure I got this correctly!!

K. Whitton continued her presentation slides discussing various confidence interval (CI) procedures noting that standard CI's are based on the binomial distribution. She continued by discussing Bootstrapping (percentile, profile and bias corrected) and indicated that she would be using a percentile Bootstrapping method for the Clear Creek and Battle Creek data. Additionally there is an Asymptotic method and one by Steinhorst et al. 2004. Discussion ensued throughout and a summary is presented below (Table 1.).

Comment [b2]: All monitoring groups please send me your information to complete and correct the information in this table.

Table 1. Summary of JMPWT programs that calculate abundance estimates and confidence intervals (not all members present-all feel free to add information).

Project	PI	Abundance Estimates	Estimator used	Confidence Intervals
Feather River RSTs	Jason Kindopp	Yes (daily passage est)	Chapmans	Y-Binomial @ 95%
Battle Creek RSTs	Kellie Whitton	Yes (daily passage est)	Bailey's??	Y-Bootstrap @ 95%
RBDD RSTs	Bill Poytress	Yes (daily passage est)	Lincoln-Peterson	Y-Binomial @ 90%
Tuolumne R. RSTS	Dennis Blakeman	Yes (based on % day)	???	???
Knight's Landing RSTs	Joe J or Robert V	Yes (weekly passage)	Modified Peterson	Y-Binomial @ 80%
Mokelumne RSTs	Michelle Workman	Yes (daily passage est)	Lincoln Peterson	Y-Binomial @ 95%
Butte Creek RSTs	Tracy McReynolds	No	-	-
Stanislaus RSTs	SP Cramer	?	?	?

Questions were asked of the group as to what people do when they miss samples. Members stated that they often have to interpolate the missed days by taking an average of the samples before and after or by taking a weekly mean to impute values for the unsampled days. It was noted that abundance estimates can be difficult to produce and the accuracy can be highly suspect when sampling cannot be conducted (usually due to high flows etc…) during peak periods of emigration. It was also noted that most groups are creating *estimates* and that by providing confidence intervals and detailed discussion of the sampling that took place to derive estimates is about as good as can be done for this type of work.

[Additionally, quantifying effort and relaying that information in abundance reports is very important to provide insight into the accuracy of estimates.]

Break for Lunch.

Return and begin discussion with **Tom Cannon's** (Wildlands Inc.) presentation of *Smolt Abundance Estimators*. **T. Cannon**, while working with the Fishery Foundation was asked to generate abundance estimates based on rotary- screw trapping data collected on the Consumnes River. He explained that they conducted a mark-recapture experiment and that no fish were recaptured. They ended up simply graphing catch. From this he learned that if he were to do this again he would produce a fry estimate by releasing fry into the population and would lump recaps by year to produce daily population estimates. He noted that daily efficiencies by size class would be the best approach, using the Peterson method and to calculate confidence intervals using the binomial distribution. He provided a handout of his approach that uses the following equation:

$$N_t = n_t / (P_{ta} \times GS_{ta})$$ where:

N_t = Total number of smolts passing point during time period (t).

n_t = Total number of smolts collected in trap during time period (t).

P_{ta}= proportion of population passing point that passes through area '**a**' during time period 't'.

GS_{ta} = proportion of P_{ta} that is captured by gear (Gear Selectivity).

$(P_{ta} \times GS_{ta})$ = Proportion of tagged fish released upstream that are collected in trap.

Other factors and independent variables: length of fish; habitat conditions (e.g., flow during period 't').

Potential biases: randomness of tagged fish releases; mortality of tag releases; differential gear avoidance by tagged fish; gear mishaps; sampling crew capabilities.

CI = use Peterson estimate (single trap) or use two traps for error est (N_t)

Discussion ensued as to the feasibility of this approach in a large river system and **T. Cannon** indicated it could be done as long as the marked fish were distributed among the population. He also noted that it would not matter how many days of sampling you missed, because your estimates would be based on the pooled recaps for the season.

The discussion then turned to the methods employed by **J. Kindopp** on the Feather River. He passed out a handout detailing his methods. The basics are noted in Table 1 of this summary. He noted that they conduct day releases of their elastomer marked fish, and that he may try evaluating day vs. night releases and their associated efficiency results. His group aslso conducted river left and right paired releases and did not see and change in their

efficiency values. He noted that his passage estimates follow the methods used by Roper and Scarnecchia (2000). He stated that daily passage estimates are not made for periods when the trap is not sampling for seven consecutive days in an effort to avoid making unreasonable inferences. **M. Brown** asked what typical fall-run Chinook salmon production estimates are. **J. Kindopp** responded 6M to 15 M for the Low Flow Channel and 12M to 30M for the high flow channel. He stated that when they have related juvenile production to spawners that it works to a point, but then superimposition clouds the relationship (?). He estimates his egg to outmigrant survival to be roughly 10-15% on average. Next steps include attempts to increase production by adding gravel to the river.

VIII. Next Meeting Information: Tentative Date set as Thursday November 16, 2006.
Location to be determined and date to be confirmed as it approaches. Discussion topic to be focused on *Mark-Recapture Techniques: Similarities and Differences noted using hatchery and wild salmonids to estimate gear efficiency*. Please feel free to contact Bill Poytress if you have any input to provide for this topic or would prefer another topic. Some other topics mentioned were: Mortlaity of fish due to handling and a review of program's methods.